

REVISION OF PENSTEMON SECTION CHAMAELEON (SCROPHULARIACEAE)

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The herbarium discovery of an apparently new species of *Penstemon* from southern Arizona led to an investigation of the species related to it. It soon became apparent that this species and its relatives comprise an entirely new section of *Penstemon*, sharply separated from other sections by the peculiarly flattened and twisted anther sacs which are usually sharply toothed or stoutly hispid at the suture. The name chosen for the new section is derived from the name of a lizard genus which is notorious for color-changes. This alludes to the fact that both red-flowered and blue-purple-flowered species are accommodated in the section and that in any one species the opposite pigment apparently underlies the primary one. In poorly pressed or old material, the true color may be difficult of determination, and indeed, Asa Gray named one species twice, first as a blue-purple species, and second as a red species!

Although flower color may occasionally be confused, it is still the most useful character taxonomically, and species divided on that basis do not actually intergrade. Indeed, had Asa Gray more critically examined the specimen he thought to be red-flowered, his mistake could have been avoided. Instead, I believe, he relied on the collectors field notes which I believe referred not to the plant before him, but rather to *P. ramosus* below.

The "new species" has already been adequately described by E. L. Greene in 1888, but the name applied by him is a later homonym of one applied to another species. The name *Penstemon ramosus* below is therefore an avowed substitute for Greene's name, and the species strictly speaking is not new. Stillborn herbarium names have been applied to species of the section by Standley, Greene, and Pennell. An anonymous *nomen nudum* has been applied to the section in various publications of the American Penstemon Society, while at least the herbarium name coined by Standley has appeared in horticultural literature as an anonymous *nomen nudum*, also. Only valid published names, or at least effectively published names are listed below, except where a herbarium name coined by Greene enters intimately into the problem of typifying *P. ramosus*.

PENSTEMON sect. **Chamaeleon** Crosswhite, sect. nov. Caudex suffrutescens. Folia lanceolata integra pubescentia. Corollae rubrae vel purpureae, ventricosae vel tubulosae. Antherarum loculi contortissimi suturis dentato-hispidis. Typus: *Penstemon lanceolatus* Benth.

KEY TO SPECIES OF SECTION CHAMAELEON

A. Corollas red, tubular.

B. Stems unbranched below the inflorescence; leaves mostly 4-8 mm. wide, not revolute 1. *P. lanceolatus*

BB. Stems branched below the inflorescence; leaves revolute, those of the branches 1 mm. wide, those of the stem 3-6 mm. wide.

. 2. *P. ramosus*

AA. Corollas blue-purple, ventricose (tubular in *P. dasyphyllus* when young).

C. Inflorescence densely glandular 4. *P. dasyphyllus*

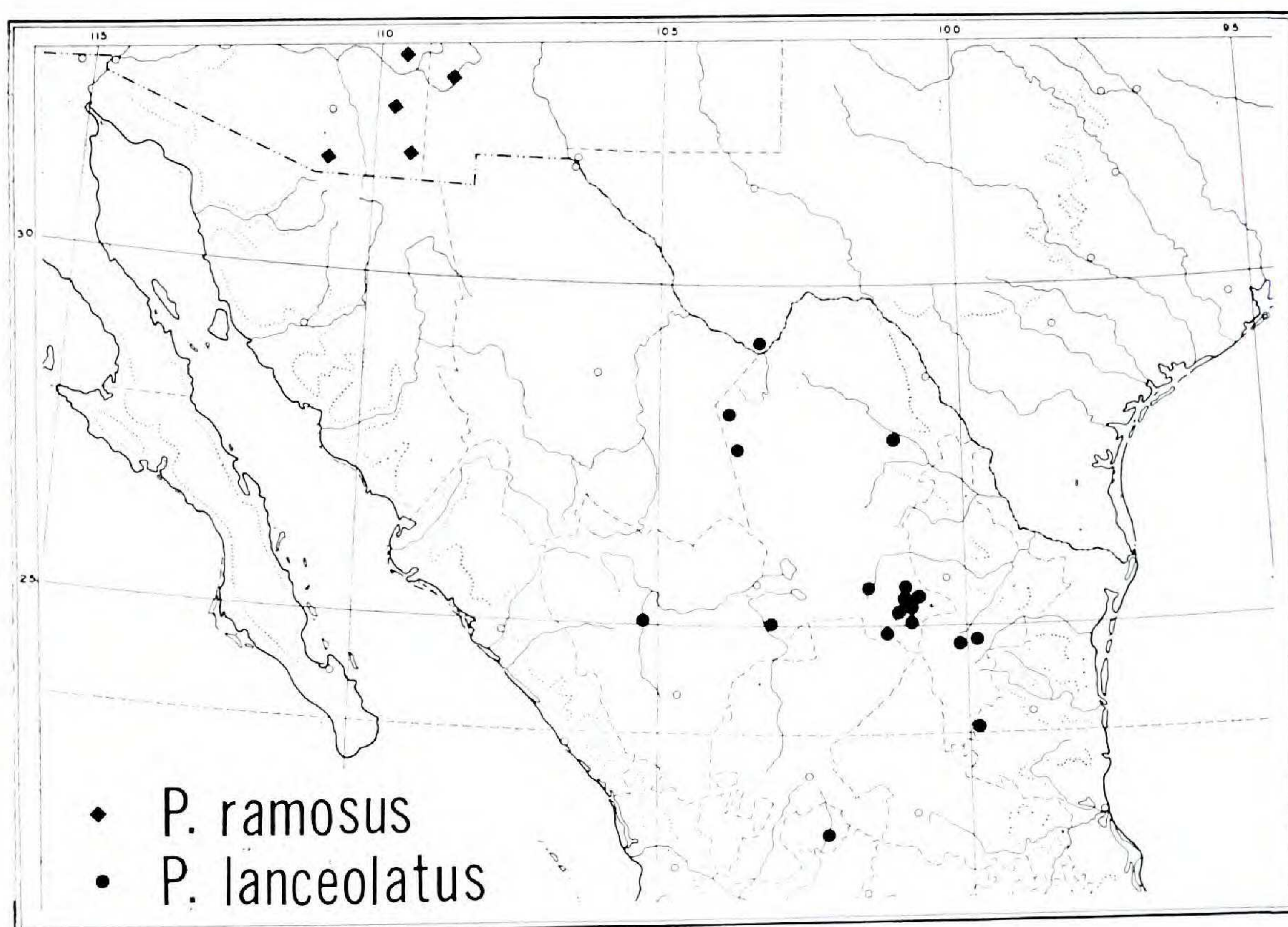
CC. Inflorescence eglandular 3. *P. stenophyllus*

1. **PENSTEMON LANCEOLATUS** Benth., *Plantae Hartwegianae* 22, 1839. Type: "in petrosis Mexicanis prope Aguas Calientes", Hartweg 184 (Herb. Benth., not seen; photo, GH.; isotype, GH!). The photograph of the holotype in the Gray Herbarium is accompanied by H. M. Hall's (1928) observations: "Herbage densely puberulent, the hairs on the lower stem stiff and short, those of the inflorescence gland-tipped, as also some of those below." The Gray Herbarium isotype very closely matches the holotype and also bears capsules which the holotype lacks.

Stems 1-5 from a thick, coarse, woody caudex, not normally branched below the inflorescence, 2-5.5 dm. high, lightly to densely puberulent or pubescent, glandular pubescent above; basal leaves usually absent at anthesis, light green or bluish-green, lanceolate, 5-8 mm. wide, 25-40 mm. long, lightly puberulent to glabrescent below, moderately puberulent on the upper surfaces; cauline leaves darkening in drying, narrowly lanceolate, mostly 4-8 mm. wide and 25-85 mm. long, (or occasionally broadly lanceolate, about the same length but to 22 mm. wide), lightly puberulent above to moderately pubescent both on the upper and lower leaf-surfaces; inflorescence moderately to densely glandular-pubescent, cymose, usually with only one branch per node growing, this of 1 or 2 flowers; corollas straight, red, 25-32 mm. long, often white-pubescent externally; sepals 5-7 mm. long, opaque, glandular, red-margined in flower, brown in fruit; capsules 14-15 mm. long, 4-valved, the lobes spreading with dehiscence; seeds ca. 2.5 mm. long.

Specimens examined:

MEXICO: AGUASCALIENTES: Aguascalientes, *Hartweg* 184 (GH), *Rose & Hay* 6219 (GH), *Rose & Painter* 7728 (GH). COAHUILA: Battlefield near Buena Vista, *Gregg* 57 (GH). Canon del Indio Felipe, in Sierra Hechiceros, *Stewart* 151 (GH). Carneros Pass, *Johnston* 7286 (GH). 2-16 mi. e. of Carneros Pass, *Correll & Johnston* 21324 (LL). Above Chorro de Agua, *Correll & Johnston* 21367 (LL). 15 km. w. of Concepcion del Oro, *Stanford et al.* 538 (GH). 11 km. n.e. of Jimulco, *Radford et al.* 28 (GH). West base of Picacho del Fuste, n.e. of Tanque Vaionetta, *Johnston* 8446 (GH). Muzquiz, *Marsh* 173 (TEX). Palomas Negras, 8 km.



w. of Sierra Mojada, *Stewart* 2192 (GH). Saltillo, *Palmer* 19 (GH). N. of Saltillo, *Gregg* 441 (GH). 6 mi. e. of Saltillo, *Palmer* 974. San Lorenzo Canyon, 6 mi. s.e. of Saltillo, *Palmer* 550 (GH). Sierra Almagre, above Rancho El Almagre, *Johnston & Muller* 1168 (GH). Sierra Paila, G. Cepeda, *Hinton et al.* 16548 (GH). DURANGO: Papasquiario, *Nelson* 4665 (GH). Santiago Papasquiario, *Palmer* 403 (GH). NUEVO LEON: 3 mi. s. of Galeana, *Correll & Johnston* 19858 (LL). Vic. Rancho Pabillito, 15 mi. s.w. of Pueblo Galeana, *Mueller & Mueller* 500, 531, 600 (GH). TAMAULIPAS: 4 km. w. of Miquihuana, *Stanford et al.* 612. (GH).

UNITED STATES: TEXAS: BREWSTER CO.: Head of Heath Canyon, Dead Horse Mts., Big Bend Nat. Park, *Warnock* 10725 (LL, SMU).

Richard Straw (1959) has pointed out the confusion that has existed between this species and the other red-flowered species of Mexico. His treatment is composite, of *P. lanceolatus* and *P. ramosus*, but those specimens cited from Mexico and Texas probably refer to *P. lanceolatus*.

2. *PENSTEMON ramosus*, Crosswhite, nom. nov.

Penstemon pauciflorus Greene, in Bot. Gaz. 6:218. 1888. Type: "Bluffs of the Rio Gila", August 30, 1880, E. L. Greene. By the time Greene finally named the species, he had probably already distributed the specimens under another manuscript name which proved to be a later homonym, necessitating the change. If so, his description might have been

drawn from memory and fragmentary notes. If this is the case, the specimen labelled "Penstemon angustifolius, n. sp., Bluffs of the Rio Gila, Aug. 29, 1880" by Greene in the Gray Herbarium may be part of the type material. Not *P. pauciflorus* Buckley, 1862.

Robust heterophyllous perennials from a woody caudex; stems 3-7.5 dm. tall, puberulent, often branching midway up the stem; leaves of the branches linear, ca. 1 mm. wide and 25 mm. long; leaves of the main stem 3-6 mm. wide, 6-11 cm. long, isophyllous among themselves, narrowly linear-lanceolate, moderately puberulent, involute; inflorescence moderately to densely glandular-pubescent, a modified cyme with only one branch at a node, this bearing one or two flowers; corollas straight, red, 28-40 mm. long; sepals 5-10 mm. long; anther sacs opening almost throughout, twisted, not at all explanate, the sutures not toothed; capsules 9-15 mm. long, 4-valved, the lobes widely divaricate with dehiscence; seeds ca. 3 mm. long.

Specimens examined:

ARIZONA: COCHISE CO.: Paradise, *Blumer 1604* (GH), *Peebles 5847* (US, not seen; photo PH!). GRAHAM CO.: Frye Mesa, Pinaleno Mts., *Maguire et al. 11723* (PH). GREENLEE CO.: ½ mi. n. of Metcalfe, *Maguire et al. 11811* (PH). PIMA or SANTA CRUZ CO.: Santa Rita Mts., *Pringle s.n.* (GH).

NEW MEXICO: Bluffs of the Rio Gila, *Greene 281* (GH).

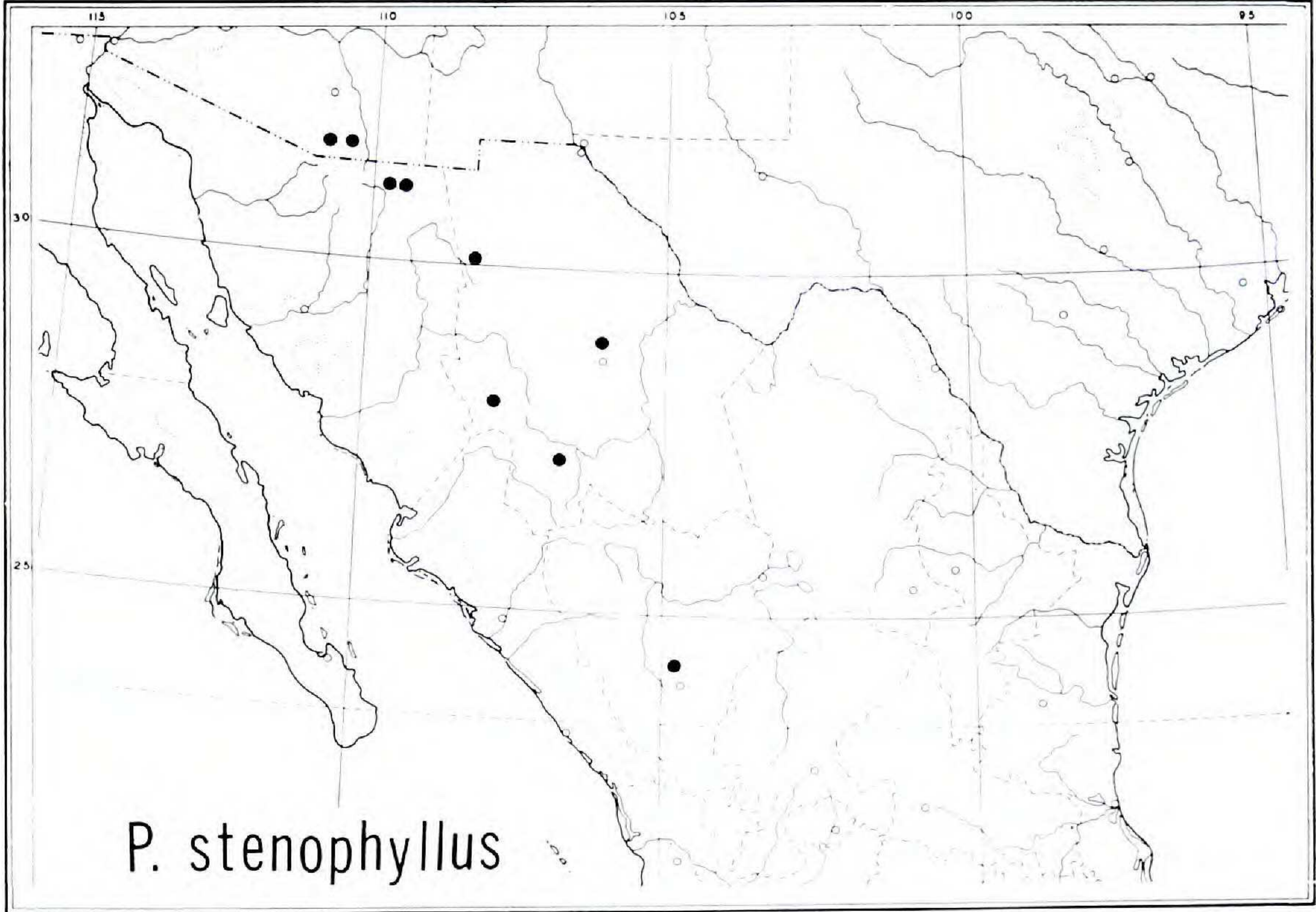
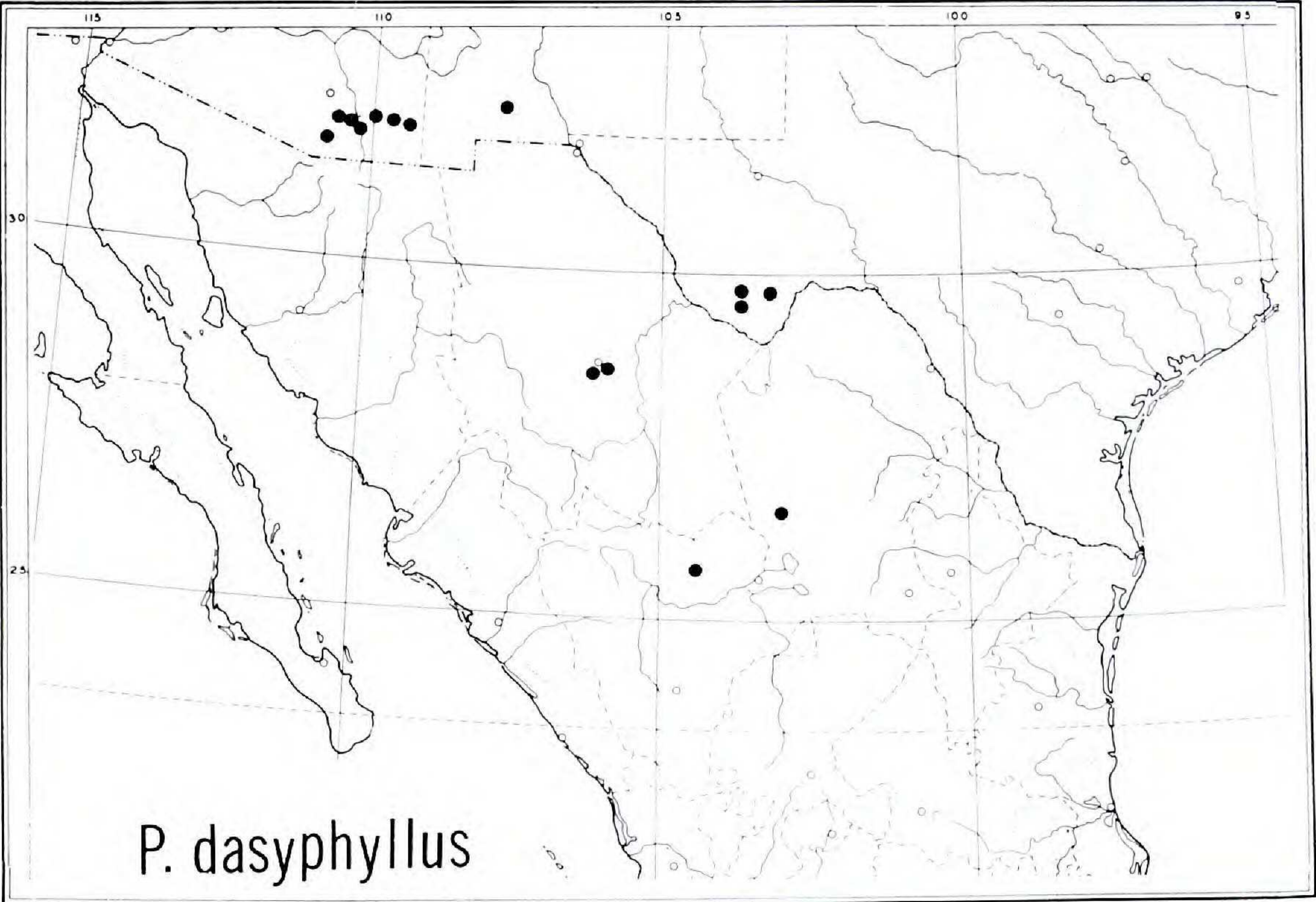
This is the species referred to as "*P. lanceolatus*" in *Arizona Flora* by Keck (Kearney & Peebles, 1959); the specimens cited by Nisbet & Jackson (1960) from New Mexico in "The genus *Penstemon* in New Mexico" are probably also referable here.

3. *PENSTEMON STENOPHYLLUS* A. Gray, Bot. U.S. & Mex. Bound. Surv. 112. 1859. Type: "Hills from Babocomori towards Santa Cruz." *C. Wright 1477* (GH!, labelled in Gray's hand "*Penstemon stenophyllus* n. sp.").

Penstemon rubescens A. Gray, Proc. Amer. Acad. 19: 92. 1883.

Type. Jarvis Canyon?, near Fort Huachuca, *Lemmon 2852* (GH!).

Tall willowy perennials from a suffrutescent caudex, erect with narrow spreading parts, therefore airy; stems 2-9 dm. tall, puberulent to apparently glabrous, simple (i.e. branched only in the inflorescence); leaves all cauline in anthesis, linear, 6-13 cm. long, 1-3 (-5) mm. wide, lightly to moderately puberulent or apparently glabrous, occasionally folded or revolute; inflorescence glabrous or nearly so, usually spreading and much-branched, the cymes regular or nearly so (i.e. both lateral branches growing at a cymose branch); corollas well-inflated, blue-purple or apparently occasionally reddish (Gentry 1897 "lutescent lavender, petals deepening to purple, throat very pale with deep red lines; Gentry 2583 "red-purple; throat whitish, streaked with purple"), 23-37



mm. long; sepals wide (to 4-5 mm.), erosulate, caudate, hyaline-margined, glabrous; anther sacs twisted or occasionally almost straight, opening almost throughout, but not at all explanate, the sutures with abundant white teeth; capsules ca. 15 mm. long, 4-valved, the lobes spreading widely with dehiscence; seeds 2-3 mm. long.

Specimens examined:

UNITED STATES: ARIZONA: Hills from Babocomori toward Santa Cruz, *Wright* 1477 (GH). Near Fort Huachuca, *Lemmon* 2851, 2852, 3046 (GH).

MEXICO: CHIHUAHUA: 20 mi. n. of Chihuahua *Stewart & Johnston* 2126 (GH). Near Colonia Garcia, *Townsend & Barber* 313 (GH). Loreto, Rio Mayo, *Gentry* 2583 (GH). 63 mi. w. of Parral on rd. to El Vergel, *Correll & Gentry* 22873 (LL). 8 mi. n. of Santo Tomas, *Muller* 3387 (GH). Sierra Madre, *Nelson* 6312 (GH). Sierra Canelas, Rio Mayo, *Gentry* 1897 (GH). DURANGO: Otinapa, *Palmer* 430 (GH). Sandia Station, *Pringle* 13663 (GH). SONORA: Between San Pedro and Fronteras, *Hartman* 890 (GH). Cosiquiriachi, *Wislizenus* 186 (GH).

4. *PENSTEMON DASYPHYLLUS* A. Gray, Bot. U.S. & Mex. Bound. Surv. 112. 1859. The type sheet contains five plants apparently representing three separate collections. Luckily, all are referrable to *P. dasyphyllus* and were probably meant by Gray to together represent his new species, as he wrote in the lower right hand corner of the whole sheet, "*P. dasyphyllus* n. sp.". This was inadvertently covered up by the Synoptic Flora annotation label and can scarcely be seen without candling. The three collections above "*P. dasyphyllus* n. sp." have three separate labels, and with some difficulty it is possible to associate the proper plants with the proper labels. Francis W. Pennell (1941) without mentioning that all three of the collections were mounted on the same sheet, designated one, C. Wright 1478, as the type. The label for this collection (on the usual blue-colored printed paper) also bears Asa Gray's "*P. dasyphyllus* n. sp.", but Pennell chose it for the type because it "is accompanied by an open flower showing special study by Gray". The packet containing this flower is above the stems that I believe should go with the Wright label, but the same packet contains a flower which seems, from the stain marks on the paper, to have come from another collection. I do not find a place on the Wright collection stems where the other (opened and critically studied) flower could have been attached. I believe that since the packet was probably placed over the Wright collection in Asa Gray's time to accommodate the opened flower (the paper being cut from manuscript notes of about that date), that the critically studied flower probably did indeed come from Wright 1478, perhaps from material (now isotypical) transmitted later to the Boston Society of Natural History or elsewhere. The other material in the packet may have been added later by someone unfamiliar with

Gray's methods of mounting specimens. In the absence of exacting criteria in the International Rules of Botanical Nomenclature, I here designate the three stems on the left of the sheet and the open flower dried onto manuscript notes in the packet as the type. The second collection on the sheet is co-typical and is now a paratype, labelled (by Gray) "San Pedro. E. K. Smith." In the type description it is cited "Valley of the San Pedro, Sonora, Capt. E. K. Smith . . .". The third collection, the last on the right of the sheet, is from the Mexican Boundary Survey, but does not have the characteristic blue ticket of Wright, having rather a general printed label bearing the names of Parry, Bigelow, Wright, and Schott. It is best considered a paratype and is a wide-leaved form rather different from the other material on the sheet. As Pennell has pointed out, Wright's field notes indicate number 1478 (through his field number 267 written under the label by Gray) to have come from "Stony hills of the Pecos." The simplest explanation is that the third specimen, therefore, is from the other locality cited by Gray, "Cook's Spring, New Mexico." A fourth location, however, "Valley of the Santa Cruz River" mentioned in the type description is yet unaccounted for in the Gray Herbarium specimens, but would appear from the sentence structure to have been found by E. K. Smith's group, and hence not eligible to receive the printed label of Parry, Bigelow, Wright & Schott.

P. stenophyllus var. *dasyphyllus* (A. Gray) A. Gray, Syn. Fl. (reissue) vol. 2 pt. p. 441. 1886.

Perennial from a suffrutescent caudex; stems 2 to many, 2-4.5 dm. high, close-pubescent below, pronouncedly glandular above; leaves usually all cauline in anthesis, or if basal, not strictly different from the cauline (the true basal rosettes apparently appearing before anthesis and therefore never collected); cauline leaves typically densely pubescent with short stiff hairs, often not at all heavily so, especially on the lower surfaces, narrowly lanceolate to linear-lanceolate, 4 mm. wide and 65 mm. long or very rarely more widely lanceolate to 12 mm. wide and 65 mm. long, usually folded at the midrib to totally conceal the upper leaf-surface, occasionally revolute; secondary fascicles occasionally present in the leaf axils, these expanding to form sterile or fertile branches or remaining contracted as the fascicles of section *Fasciculus* Keck ex Straw; inflorescence densely glandular-pubescent, anomalous in being a polychasial cyme which at each branching usually forms only one lateral branch, this usually reduced to a single flower and the entire inflorescence appearing simply racemose, but determinate; corollas inflated, blue-purple to pink-lavender (Hewitt 326 "reddish blue"; Lemon 419 with "red fl."), 27-35 mm. long; sepals densely pubescent entire, 5-8 mm. long; anther sacs opening almost throughout but not at all explanate, twisted, the sutures long-dentate; staminode glabrous;

capsules 11-15 mm. long when mature, 4-valved, the lobes spreading widely with dehiscence; the persistent calyx about 2/3 the length of the capsule; seeds ca. 2 mm. long.

Specimens examined:

UNITED STATES: ARIZONA: COCHISE CO.: 6 mi. w. of Benson, *Maguire & Maguire 11704* (GH). 4 mi. n.e. of Dragoon, *Maguire & Maguire 11181* (GH). Lewis Spring, Chiricahua Mts., *Lemmon 253* (GH). Rucker Valley, *Lemmon 397, 419* (GH). Speiden Ranch, 10 mi. w. of Benson, *Glendening s.n.* (WIS). PIMA CO.: Between Sonoita and Vail, *McKelvey 2106* (GH). SANTA CRUZ CO.: Patagonia to Sonoita, *Peebles & Fulton 11464* (GH). 2 mi. n. of Vaughn, *Arnold s.n.* (GH). COUNTY UNCERTAIN: Valley of San Pedro, *Smith et al. s.n.* (GH). NEW MEXICO: Niggerhead Mts., near Monument No. 82, *Mearns 1922* (GH). Cook's Spring?, *Mexican Boundary Survey s.n.* (GH).

MEXICO: COAHUILA: Canon del Cuervo Chico, ca. 16 km. n. of Cuesta Zozaya, *Johnston 8532* (GH). West base of Sierra de los Guajes, 7 km. e. of Rancho Buena Vista, *Stewart 1475*. Sierra del Pino, vic. La Noria, *Johnston & Muller 429* (GH). CHIHUAHUA: 2 mi. s.w. of Chihuahua, *Correll & Johnston 21583* (LL). Santa Eulalia, *Hewitt 289, 317, 326* (GH), *Palmer 134* (GH). DURANGO: 11 mi. e. of La Zarca, *Correll & Johnston 20266* (LL). 3-6 mi. w. of La Zarca Jet., *Straw & Forman 1715* (WIS).

TEXAS: BREWSTER CO.: Bear Creek, ca. 30 mi. s.e. of Marathon, *Correll & Rollins 23745* (LUN, type). 47 mi. s. of Alpine, *Rose-Innes & Moon 1161* (WIS). Oak Canyon, *Moore & Steyermark 3360* (GH). Terlingua to Alpine, *Tharp s.n.* (GH). COUNTY UNCERTAIN: Stony hills of the Pecos, *Wright 1478* (GH).

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